

THE KARSKIY CRATERS ARE THE PROBABLE RECORDS OF CATASTROPHE AT THE CRETACEOUS-TERTIARY BOUNDARY. E.M. Kolesnikov¹, M.A. Nazarov², D.D. Badjukov², Yu.A. Shukolyukov², ¹Geology Faculty of Moscow State University, 119899 Moscow; ²Inst. of Geochemistry and Analytical Chemistry, USSR Academy of Sci., Moscow.

In order to corroborate the hypothesis of Alvarez L.W. and others (1) about the connection of mass mortality and meteorite or cometary impact at the KT boundary, it is necessary to find a meteorite crater which was formed at the same time. Masaitiss V.L. suggested that (2) the Karskiy craters (USSR) are suitable, but previous K/Ar data from other laboratories are very different (from 47 to 82 million years).

In 1987 we gathered impact glasses from the Karskiy (60 km in diameter) and Ust-Karskiy (25 km) craters K/Ar age analyses ($\delta \approx 1\%$) were performed at the laboratory of Geology Faculty of Moscow University. The glasses cooled very rapidly and had the youngest model ages from 65,8 to 67,6 million years. The slower cooling crypto-crystalline aggregates had more ancient model ages—from 70,5 to 73,9 m.y. as had tagamite (68,5 and 70,6 m.y.) because they captured excess argon during crystallization. Excess argon fills in the inclusions and other disturbances of the crystalline structure. It separated at lower temperatures than radiogenic argon. This fact was determined during special experiments with grinding of glass samples and temperature separation of argon. Excess argon is almost completely absent in all the glasses except for one quartz glass with a low content of potassium (0,22%). From this example, ⁴⁰Ar was separated practically completely after grinding.

Least squares analysis showed that with probability of 99% our findings on crypto-crystalline aggregates, tagamite and quartz glasses from the Karskiy and Ust-Karskiy craters lie on an isochron which has an age of $65,8 \pm 1,1$ million years and a content of excess argon of $(0,47 \pm 0,08) 10^{-6} \text{ cm}^3/\text{g}$. The rest of glasses fall off the regression line. For the two glasses with identical composition which have different quantities of secondary non-potassium minerals we determine by an independent method the content of excess argon. Taking into account these data a more exact slope of the first isochron of $66,4 \pm 1,0$ million years was observed and the second "glass" isochron with age $66,5 \pm 1,1$ million years was constructed. The combined isochron provides the most probable age of $66,1 \pm 0,8$ million years which corresponds to the Cretaceous-Tertiary boundary date. The Karskiy craters may be the records of fragments which were formed during the giant cosmic body break-up.

REFERENCES: (1) Alvarez L.W. et al (1980) Science, v.208, p. 1095-1107. (2) Masaitiss V.L., Mashak M.S. (1982) Reports Acad., Sci. USSR, v.265, p. 1500-1503.

THE KARSKIY CRATERS AND C-T EVENT
Kolesnikov E.M., Nazarov M.A. et al.

